

***Remarks***

Reconsideration of this Application is respectfully requested.

Upon entry of the foregoing amendment, claims 18 and 20-27 are pending in the application, with 18 being the independent claims. Claim 27 is withdrawn. Support for the amendment to claim 18 can be found, for example, in the second and third full paragraphs on page 21 of the specification. These changes are believed to introduce no new matter, and their entry is respectfully requested.

Based on the above amendment and the following remarks, Applicants respectfully request that the Examiner reconsider all outstanding objections and rejections and that they be withdrawn.

***Rejections under 35 U.S.C. § 112***

Claims 18 and 20-26 have been rejected under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. In particular, the use of the term "separately" was considered new matter. In order to expedite prosecution, Applicants have amended claim 18 to recite, "depositing a thin film consisting of titanium on a bottom metal layer such that parts of the thin film are deposited on crystal grain boundaries of the bottom metal layer to form seed crystals." This limitation has support in the second and third full paragraphs of page 21 of the specification. Applicants respectfully request that the rejection be withdrawn.

***Rejection of claim 18 and 20 under 35 U.S.C. § 102***

Claims 18 and 20 have been rejected under 35 U.S.C. § 102(b) as being anticipated by the publication to Klee *et al.*, titled "Analytic Study of Growth of

Polycrystalline Titanate Thin Films" (the "Klee publication"). Applicants respectfully traverse this rejection.

Claim 18 has been amended to recite "depositing a thin film consisting of titanium on a bottom metal layer such that parts of the thin film are deposited on crystal grain boundaries of the bottom metal layer to form seed crystals." The Examiner points to page 264 of the Klee publication for disclosure of depositing a thin titanium (Ti) film, such as BaTiO<sub>3</sub> or SrTiO<sub>3</sub>, on a bottom metal layer, such that parts of the thin metal film remain on crystal boundaries of the bottom metal layer and form seed crystals.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987); M.P.E.P. § 2131. The Klee publication does not disclose each and every element set forth in claim 18, particularly "depositing a thin film consisting of titanium on a bottom metal layer such that parts of the thin film are deposited on crystal grain boundaries of the bottom metal layer to form seed crystals."

The Klee publication appears to disclose depositing a thin film on the surface of a bottom electrode for a ferroelectric capacitor wherein the thin film is a Bi<sub>4</sub>Ti<sub>3</sub>O<sub>12</sub>, BaTiO<sub>3</sub>, SrTiO<sub>3</sub>, PbTiO<sub>3</sub> and PbZr<sub>x</sub>Ti<sub>1-x</sub>O<sub>3</sub> formed by a sol-gel or MOD method (page 264). The limitation "depositing a thin film consisting of titanium" in claim 18 limits the thin film to be only titanium, meaning the thin film does not contain other substances. The Klee publication does not disclose or suggest a thin film having only titanium. It is noted that the Klee publication discloses a 5 nm thick titanium adhesion layer, but this functions as an adhesion layer and does not form seed crystals as required in claim 18

(page 264). The Klee publication does not disclose or suggest depositing a thin film consisting of titanium on a bottom metal layer such that parts of the thin film are deposited on crystal grain boundaries of the bottom metal layer to form seed crystals. The Klee publication does not anticipate claim 18.

Accordingly, for at least the above reasons, independent claim 18 and claim 20, which depends therefrom, are patentable. Applicants respectfully request that the Examiner reconsider the rejection of the claims and that this rejection be withdrawn.

***Rejections of claims 18 and 20-26 under 35 U.S.C. § 103***

Claims 18, 20, 21, 22 and 23 have been rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 6,056,994 to Paz de Araujo *et al.* (the "Paz de Araujo" patent) in view of the Klee publication. Claims 24-26 have been rejected under 35 U.S.C. § 103(a) as being obvious over the Paz de Araujo patent in view of the Klee publication and further in view of U.S. Patent No. 4,963,390 to Lipeles *et al.* (the "Lipeles patent"). Applicants respectfully traverse these rejections.

Claim 18 has been amended to recite "depositing a thin film consisting of titanium on a bottom metal layer such that parts of the thin film are deposited on crystal grain boundaries of the bottom metal layer to form seed crystals." The Examiner points to P20 in Figure 14 in the Paz de Araujo patent as disclosing depositing a thin metal film on a bottom metal layer, such that parts of the thin metal film remain on crystal boundaries of the bottom metal layer and form seed crystals. Applicants respectfully traverse this rejection.

The Paz de Araujo patent discloses coating a mist of precursor solution formed from a mixture of three metal carboxylates (FIG. 14). There is no disclosure or

suggestion of the precursor solution being a thin film consisting of titanium. The limitation "depositing a thin film consisting of titanium" in claim 18 limits the thin film to be only titanium, meaning the thin film does not contain other substances. It is noted that the Paz de Araujo patent discloses depositing a thin titanium metal layer of about 200 Angstroms on top of a silicon dioxide layer in order to assist a subsequently deposited platinum layer in adhering to the silicon dioxide (col. 9, line 64 to col. 10, line 5). This titanium layer functions as an adhering layer and does not form seed crystals as required in claim 18. The Paz de Araujo patent does not disclose or suggest depositing a thin film consisting of titanium on a bottom metal layer such that parts of the thin film are deposited on crystal grain boundaries of the bottom metal layer to form seed crystals.

As noted above, the Klee publication does not disclose or suggest depositing a thin film consisting of titanium on a bottom metal layer such that parts of the thin film are deposited on crystal grain boundaries of the bottom metal layer to form seed crystals.

The Lipeles patent does not disclose or suggest depositing a thin film consisting of titanium on a bottom metal layer such that parts of the thin film are deposited on crystal grain boundaries of the bottom metal layer to form seed crystals.

A combination of the teachings of the Paz de Araujo patent, the Klee publication, and the Lipeles patent does not disclose or suggest depositing a thin film consisting of titanium on a bottom metal layer such that parts of the thin film are deposited on crystal grain boundaries of the bottom metal layer to form seed crystals. Claim 18 is non-obvious.

Accordingly, for at least the above reasons, independent claims 18 and claims 20-26, which depend therefrom, are patentable. Applicants respectfully request that the Examiner reconsider the rejections of the claims and that these rejections be withdrawn.

### ***Conclusion***

All of the stated grounds of objection and rejection have been properly traversed, accommodated, or rendered moot. Applicants therefore respectfully request that the Examiner reconsider all presently outstanding objections and rejections and that they be withdrawn. Applicants believe that a full and complete reply has been made to the outstanding Office Action and, as such, the present application is in condition for allowance. If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided.

Amdt. dated Oct. 13, 2006 - 10 -  
Reply to Office Action of July 13, 2006

SUMI *et al.*  
Appl. No. 10/815,757

Prompt and favorable consideration of this Amendment and Reply is respectfully  
requested.

Respectfully submitted,

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